NORTH CAROLINA DIVISION OF **AIR QUALITY**

Application Review

Issue Date: xx/xx/2020

Region: Winston-Salem Regional Office

County: Rockingham **NC Facility ID:** 7900174

Inspector's Name: Robert Barker **Date of Last Inspection:** 06/20/2019

Compliance Code: 5 / In Physical Compliance

Facility Data

Applicant (Facility's Name): Rockingham County Landfill

Facility Address:

Rockingham County Landfill

281 Shuff Road

Madison, NC 27025

SIC: 4953 / Refuse Systems

NAICS: 562212 / Solid Waste Landfill

Facility Classification: Before: Title V After: Title V

Fee Classification: Before: Title V After: Title V

Permit Applicability (this application only)

SIP: 15A NCAC 02D .0516, .0521, .0524, .1100,

.1806, and 02Q .0711 NSPS: Subpart IIII **NESHAP:** Subpart ZZZZ

PSD: N/A

PSD Avoidance: N/A

NC Toxics: 02D .1100, 02Q .0711

112(r): N/A Other: N/A

Contact Data			Application Data
Facility Contact	Authorized Contact	Technical Contact	Application Number: 7900174.20A
Kathryn Jolly Env. Compliance Solid Waste Program Mgr. (336) 941-7175 PO Box 132 Wentworth, NC 27375	Kathryn Jolly Env. Compliance Solid Waste Program Mgr. (336) 941-7175 PO Box 132 Wentworth, NC 27375	Mousa Maimoun Project Consultant (704) 837-2005 9731 Southern Pine Boulevard, Suite F Charlotte, NC 28273	Date Received: 01/08/2020 Application Type: Modification Application Schedule: TV-Significant Existing Permit Data Existing Permit Number: 10200/T04 Existing Permit Issue Date: 02/01/2019 Existing Permit Expiration Date: 09/30/2021

Total Actual emissions in TONS/YEAR:

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CY	SO2	NOX	voc	со	PM10	Total HAP	Largest HAP
2018	0.3510	1.23	7.38	1.84	0.4720	2.80	0.9529 [Toluene]
2017	0.3400	1.55	7.37	1.84	0.4700	2.76	0.9462 [Toluene]
2016	0.2600	8.04	7.84	16.67	0.9000	6.20	3.59 [Formaldehyde]
2015	0.3800	11.75	7.54	25.18	1.22	2.63	0.8757 [Toluene]

Review Engineer: Joshua L. Harris **Comments / Recommendations:**

Issue 10200/T05

Review Engineer's Signature: Date: **Permit Issue Date:** xx/xx/2020 Permit Expiration Date: 09/30/2021

1. Purpose of Application

Rockingham County Landfill is an existing Municipal Solid Waste (MSW) Landfill located in Madison, Rockingham County. The facility submitted Application No. 7900174.20A, requesting a modification of their current air quality permit to include permit conditions for NSPS Subpart XXX, which was recently triggered with the commencement of construction of the Phase 4 expansion at the landfill. This application will be processed as a one-step significant modification, and will go through the 30-day public notice and 45-day EPA review periods prior to issuance.

The facility contact for this application is Kathryn Jolly, Rockingham County Environmental Compliance and Solid Waste Program Manager, (336-941-7175). A consultant, LaBella Associates P.C., formerly Joyce Engineering, Inc., was used for the application. The contact at LaBella is Mousa Maimoun, Project Consultant, (704-837-2005). Mr. Maimoun was also listed as the permit and technical contact for the facility in the application.

2. Facility Description

The Rockingham County Landfill consists of 5 closed, unlined, pre-Subtitle-D landfill areas, designated Cells I through V, which operate under Solid Waste Permit No. 7901, and an active Subtitle D landfill which operates under Solid Waste Permit No. 7904. The pre-Subtitle D landfill accepted approximately 1.1 million tons of waste between 1973 and 1996. The Solid Waste Section of the Division of Waste Management recently issued a permit-to-construct for the Phase 4 lateral expansion landfill and commenced construction on April 2, 2019, triggering applicability of NSPS Subpart XXX.

In 2010 the County was awarded a grant through the State Energy Office from American Recovery and Reinvestment Act (ARRA) funds to install a landfill gas collection and control system (GCCS). Landfill gas (LFG) is collected via the collection and control system (ID No. CD-GCCS), which is also tied into the leachate cleanout lines to allow for additional extraction. The landfill previously routed LFG to a LFG-fired generator, but that engine suffered a catastrophic failure and was removed from the permit in a previous revision. The landfill continues to operate the GCCS on a voluntary basis and routes the gas to a LFG-fire utility flare for incineration.

3. Application Chronology

01/08/20	The Division of Air Quality (DAQ), Raleigh Central Office (RCO), received
	Application No. 7900174.20A, which was submitted for a Significant Modification. A
	copy was forwarded to the Winston-Salem Regional Office (WSRO). The application
	contained the required forms, and there was no request for confidentiality.

- 01/10/20 RCO sent the facility a letter acknowledging receipt of permit application.
- 02/07/20 Dylan Wright provided comments on the application for WSRO.
- 02/20/20 Joshua Harris sent Mousa Maimoun an email regarding the applicability of MACT AAAA, and the request to remove the toxics conditions. The application states that MACT AAAA is applicable, but Mr. Harris asked if that statement is accurate based on Tier 2 test results. Mr. Maimoun replied stating that he would speak with the applicant and provide a response.

03/26/20 Joshua Harris sent an email to Mousa Maimoun regarding the recently promulgated changes to MACT AAAA. Mr. Maimoun replied stating that he should have information from the applicant in the coming weeks. Joshua Harris spoke with Mousa Maimoun regarding the application. Mr. Maimoun 04/14/20 stated that the applicant would rather not have the MACT AAAA conditions in the permit since the NMOC emission rate is not projected to cross the 50 Mg/yr threshold until 2025. Mr. Harris asked that the landfill submit an addendum to the application showing that they no longer wished to have MACT AAAA apply. 4/29/20 Joshua Harris received an email with amended pages of the application attached withdrawing the statement that the landfill is subject to MACT AAAA and withdrawing the request to remove toxics conditions from the permit. Joshua Harris sent electronic copies of the draft permit and review documents to 05/08/20 Booker Pullen, Samir Parekh, and Ray Stewart for comments. 05/12/20 Dylan Wright, WSRO, and Booker Pullen provided editorial comments. 05/13/20 Joshua Harris sent electronic copies of the draft permit and review documents to Kathryn Jolly and Mousa Maimoun for comments. 05/14/20 Samir Parekh responded with no comments. Joshua Harris received comments from Mousa Maimoun. 05/21/20 05/27/20 Joshua Harris sent updated drafts to Mousa Maimoun with his comments addressed. Mr. Harris asked if Mr. Maimoun had any additional comments or questions. 05/29/20 Mousa Maimoun replied, stating that he had no additional comments. Xx/xx/2030-day public notice and 45-day EPA review periods begin. Xx/xx/20Public notice period ends; [comments received]. EPA review period ends; [comments received]. Xx/xx/20Xx/xx/20 Air Quality Permit Revision No. 10200T05 issued.

4. Table of Changes to Existing Permit No. 10200T04

Page No.	Section	Description of Changes
Cover and Throughout	Cover and Throughout	Updated permit revision numbers and dates throughout.
3	1 Table	 Replaced NSPS WWW citation with a citation of NSPS XXX. Removed note indicating that the gas collection and control system is a voluntary system.
3	2.1 A.	Updated table to include the NSPS XXX requirements
4-15	2.1 A.3.	Removed permit conditions for NSPS WWW and replaced with conditions for NSPS XXX.
16	2.1 A.4.a.	Updated condition to include the latest permitting language.
17	2.2 A.	Updated applicability criteria for MACT AAAA

5. Changes in Equipment

There are no changes to the facility's permitted equipment list.

The facility's permitted emission sources are as follows:

J 1				
Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description	
ES-1 NSPS XXX	Municipal solid waste landfill facility	CD-GCCS	Cone landfill gas-fired utility flare (1,000 standard cubic feet per minute maximum flow rate, 30 million Btu per hour heat input)	

The facility's insignificant/exempt activities are as follows:

Emission Source ID No.	Emission Source Description	
IES-1	No. 2 fuel oil storage tank (3,000 gallons capacity)	
IES-2	Used oil storage tank (500 gallons capacity)	
IES-3	Used oil storage tank (280 gallons capacity)	
IES-4	No. 2 fuel oil-fired emergency engine-generator set (80 kW and 119 bhp)	
GACT ZZZZ		
IES-5	No. 2 fuel oil-fired emergency engine-generator set (16 kW and 26 bhp)	
NSPS IIII, GACT ZZZZ		
IES-6	Propane-fired emergency engine-generator set (13 kW and 30 bhp)	
GACT ZZZZ		
IES-7	Used oil storage tank (275 gallons capacity)	
IES-8	Fresh oil storage tank (275 gallons capacity)	
IES-9	Propane storage tank (175 gallons capacity)	
IES-10	Parts washer	
IES-11	Flare propane storage tank (120 gallons capacity)	
IES-12	Propane storage tank (1,000 gallons capacity)	
IES-13	Fresh oil storage tank (275 gallons capacity)	

6. NSPS, NESHAP, PSD, 112(r), CAM & Attainment Status

• **NSPS** –

- ✓ The MSW Landfill (ID No. ES-1) is NOT subject to 40 CFR 60, Subpart WWW "Municipal solid Waste Landfills," since the landfill was modified after July 17, 2014.
- ✓ The MSW landfill (ID No. ES-1) is subject to 40 CFR 60, Subpart XXX "Municipal Solid Waste Landfills that Commenced Construction, Reconstruction or Modification after July 17, 2014," since it commenced construction on the Phase 4 expansion after July 17, 2014. Additionally, the facility has demonstrated that the landfill's NMOC emission rate is above 34 Mg/yr, therefore it is required to install and operate a gas collection and control system (GCCS).
- ✓ The emergency generator (ID No. IES-5) is subject to 40 CFR 60, Subpart IIII "Stationary Compression Ignition Internal Combustion Engines," since the engine was manufactured in November 2006 which is after the applicability date of the NSPS regulation.

• NESHAP –

The MSW Landfill (ID No. ES-1) is NOT subject to 40 CFR 63, Subpart AAAA "Municipal Solid Waste Landfills." While the landfill's design capacity exceeded 2.5 million Mg and 2.5 million m³, the NMOC emission rate, determined using the Tier 2 methodology, has not yet reached 50 Mg/yr. Additionally, the landfill is not, nor is it collocated with, a major source of HAPs, therefore, the MSW Landfill is not subject to MACT Subpart AAAA.

Based on previous Tier 2 testing results, the landfill is projected to exceed the 50 Mg/yr NMOC emission rate threshold in CY2025, at which point, MACT Subpart AAAA will apply. The permit contains a permit shield with the criteria that will trigger MACT applicability.

Projected NMOC emission rates based on 2019 Tier 2 testing:

Year	Estimated Annual Waste Acceptance Rate (Mg/yr)	Solid Waste in Place (Known as of 2018) (Mg)	Projected NMOC Emission Rate (Mg/yr)
2018	92,967	2,680,950	43.6
2019	92,967	2,773,918	44.7
2020	92,967	2,866,885	45.6
2021	92,967	2,959,852	46.6
2022	92,967	3,052,419	47.5
2023	92,967	3,145,786	48.3
2024	92,967	3,238,753	49.3
2025	92,967	3,331,720	50.1

✓ The MSW Landfill (ID No. ES-1) is NOT subject to 40 CFR 61, Subpart M "Asbestos," since it does not accept asbestos containing waste.

- ✓ The emergency generators (ID Nos. IES-4 & IES-6) are subject to 40 CFR 63, Subpart ZZZZ "Reciprocating Internal Combustion Engines," and are considered existing emergency engines under this regulation.
- ✓ The emergency generator (ID No. IES-5) is subject to 40 CFR 63, Subpart ZZZZ "Reciprocating Internal Combustion Engines" and is considered a new emergency engine under this regulation. For this engine the facility complies with NESHAP Subpart ZZZZ by complying with NSPS Subpart IIII.
- **PSD** PSD is not impacted by this permit application.
 - ✓ Rockingham County has triggered increment tracking under PSD for PM₁₀, SO₂, and NOx. This permitting action is neither expected to consume nor expand any increments.
- 112(r) The facility does not store any of the listed 112(r) chemicals in amounts that exceed the threshold quantities. Therefore, the facility is not required to maintain a written Risk Management Plan (RMP).
- CAM CAM does not apply since the facility is subject to NSPS Regulations that were promulgated after November 15, 1990, and control the pollutants that would be subject to CAM.
- Attainment status Rockingham County is in attainment for all criteria pollutants.

7. Regulatory Review

The facility is subject to the following air quality regulations in addition to the General Conditions:

- 15A NCAC 02D .0516: Sulfur Dioxide Emissions from Combustion Sources
- 15A NCAC 02D .0521: Control of Visible Emissions
- 15A NCAC 02D .0524: New Source Performance Standards, 40 CFR 60, Subpart XXX
- 15A NCAC 02D .1100: Control of Toxic Air Pollutants
- 15A NCAC 02D .1806: Control and Prohibition of Odorous Emissions
- 15A NCAC 02Q .0711: Emission Rates Requiring an Air Permit

The following permit conditions are being removed as part of this permit application:

• 15A NCAC 02D .0524: New Source Performance Standards, 40 CFR 60, Subpart WWW

15A NCAC 02D .0524: New Source Performance Standards, 40 CFR 60, Subpart XXX

The Rockingham County Landfill commenced construction on the Phase 4 expansion on April 2, 2019, triggering the modification provisions and applicability of NSPS Subpart XXX. The facility conducted Tier 2 testing and submitted the results on May 15 2019, indicating that the NMOC emission rate exceeds the 34 Mg/yr threshold. An amended design capacity report was submitted on July 1, 2019, and the facility submitted the GCCS design plan on May 14, 2020, which is within12 months from the initial report indicating that the NMOC emission rate was equal to or greater than 34 Mg/yr, as required by NSPS XXX. The landfill will have 30 months from the NMOC emission rate report date to install, operate and test the GCCS, which is required to be completed by November 15, 2021.

The landfill already has a gas collection system installed and operating. The system was voluntarily installed for odor control and for a now closed LFG to energy project. In cases such as these, the DAQ does not require landfills to comply with the monitoring and recordkeeping requirements of the NSPS until the 30-month compliance timeframe has elapsed.

The conditions also include the recently promulgated provisions that allow landfills to comply with the requirements in §§63.1958, 63.1960, and 63.1961 of MACT AAAA. Compliance is expected.

8. Other Regulatory Requirements

- A Zoning Consistency Determination is NOT required for this permit application.
- The application was sealed by Mousa Maimoun, who is a registered Professional Engineer in the State of North Carolina (Seal #049153).
- No application fees were required for this submittal since the modification is being made due to a regulation change.

9. Air Toxics

This application results in no increases in toxic emissions beyond those already evaluated. Therefore, no additional toxics modeling demonstration is required. DAQ conducted modeling for the facility at the landfill's request in 2019. For that modeling exercise, the landfill projected emission rates through CY2025. The flare's emission rates were modeled at 1,050 scfm, which is the maximum capacity plus a 50 scfm margin, and the surface emission rates for the landfill were assumed to be uncontrolled since the flare was being used on a voluntary basis. Full details regarding that evaluation are in the review document for permit revision T04.

The 2019 modeling resulted in the following impacts at the property boundary:

Pollutant	Uncontrolled Volume Emissions from Closed Landfill Sites I-V (lb/hr)	Uncontrolled Volume Emissions from Subtitle D Landfill (Phases 1-4) (lb/hr)	Flare Emissions (at 1,050 scfm) (lb/hr)	AAL (μg/m³)	% AAL
Benzene	3.83 x 10 ⁻³	0.0255	6.02 x 10 ⁻⁴	0.12	80%
Hydrogen Chloride			0.434	700	4%
Hydrogen Sulfide	0.023	0.148	3.51 x 10 ⁻³	120	5%
Vinyl Chloride	1.81 x 10 ⁻³	0.0121	2.86 x 10 ⁻⁴	0.38	12%

The landfill is not yet subject to MACT or NESHAP regulations, therefore the permit will continue to contain the 15A NCAC 02D .1100 and 02Q .0711 toxics conditions. The toxic emission rates above account for emissions projected through construction of Phase 4, and emission rates should be periodically reevaluated as the landfill continues to place waste and grow.

10. Emissions Review

Pollutant	Potential After Controls / Limitations tons/yr	Potential Before Controls / Limitations tons/yr
PM (TSP)	2.00	0.00
PM_{10}	2.00	0.00
PM _{2.5}	2.00	0.00
SO_2	1.49	0.00
NOx	5.19	0.00
СО	6.12	0.00
VOC	9.74	34.28

The facility's actual emissions as reported on the annual AQEI can be seen in the table on page one of this document.

Landfill emissions:

The landfill's potential volume emissions through CY2039 were calculated using the LFG generation rate of 1,048 cfm or 550,828,800 ft³/yr from the LandGEM output using inventory conventional inputs, and pollutant concentrations from AP-42 Chapter 2.4, 2008 Draft. VOC emissions are 99.7% of NMOC emissions.

- CY2039 LFG generation rate from LandGEM = 550,828,800 ft³/year (or 1,780.6 m³/hour)
- Methane is 50% of this gas stream (890.3 m³/hour)
- Q_{NMOC} = Emission rate of NMOCs, m³/hour
- C_{NMOC} = Concentration of NMOCs (569 ppmv, 2019 Tier 2 test)
- Multiplication factor for 50% methane concentration in landfill gas = 2.0
- Molecular weight of NMOC (as n-hexane) = 86.18 g/gmol

$$Q_{NMOC} = 2.0 \times Q_{CH_4} \times \left(\frac{C_{NMOC}}{1 \times 10^6}\right)$$
 (AP-42, Equation 3)

$$Q_{NMOC} = 2.0 \times 890.3 \frac{m^3}{hour} \times \left(\frac{569 \text{ parts}}{1 \times 10^6}\right) = 1.031 \frac{m^3}{hour}$$

The uncontrolled mass emissions of NMOCs (UM_{NMOC}) was found using Equation 4 of AP-42, Section 2.4.4.2.

$$UM_{NMOC} = 1.013 \frac{m^3}{hour} \times \left[\frac{86.18 \text{ g/gmol} \times 1 \text{ atm}}{8.205 \times 10^{-5} \frac{\text{m}^3 - \text{atm}}{\text{gmol} - \text{K}} \times 1000 \frac{\text{g}}{\text{kg}} \times (273 + 25^{\circ}\text{C}) \text{ K}} \right] \times 2.2 \frac{\text{pounds}}{\text{kg}}$$

$$UM_{NMOC} = 7.85 \frac{pounds}{hour} = 34.38 \frac{tons}{year}$$

To calculate the VOC component of the landfill's uncontrolled surface emissions, AP-42 states in note "c" of Table 2.4-2 that VOC emissions are 99.7 wt.% of the NMOC emissions, therefore:

$$UM_{VOC} = 0.997 \times 34.38 \frac{tons}{year} = 34.28 \frac{tons VOC}{year}$$

Post collection and control potential emissions were calculated by applying a collection efficiency of 25% in Equation 5 from AP-42 Chapter 2.4, modified to include only the terms that apply to the landfill's surface emissions; VOC emission from the flare were calculated separately. The facility assumes a lower collection efficiency than the default due to the configuration of collection points.

$$CM_{VOC} = \left[UM_{VOC} \times \left(1 - \frac{\eta_{col}}{100}\right)\right] + \left[UM_{VOC} \times \frac{\eta_{col}}{100} \times \left(1 - \frac{\eta_{cnt}}{100}\right)\right]$$

When modified to include only terms applicable to the landfills surface emission, the equation becomes:

$$\text{CM}_{\text{VOC}} = \left[\text{UM}_{\text{VOC}} \, \times \, \left(1 - \frac{\eta_{\text{col}}}{100} \right) \right]$$

$$CM_{VOC} = \left[34.28 \frac{tons \, VOC}{vear} \times \left(1 - \frac{25}{100} \right) \right]$$

$$CM_{VOC} = 8.57 \frac{tons \, VOC}{year}$$

Flare emissions:

Total sulfur emissions were estimated using default concentrations for reduced sulfur the methodology in AP-42 Chapter 2.4. NMOC and VOC emissions for the flare are based on the flare's maximum capacity, regardless of NMOC generation rate from the landfill, and were calculated using the same methods in AP-42 and 97.7% control efficiency [2008 Draft AP-42 Table 2.4-3]. A similar example calculation for hydrogen chloride emissions can be seen in Section 6. The facility conservatively overestimates flare emissions by using 1,050 as the flare's capacity for calculations even though the flare is rated at 1,000 scfm by the manufacturer. The facility also assumes that the LFG has a moisture content of 3.6% and that it consists of 50% methane.

Particulate, NOx, and CO emissions were calculated using the following emission factors from the 2008 Draft of AP-42, Table 2.4-4:

PM: 15 lb PM/10⁶ dry ft³ CH₄ NOx: 39 lb PM/10⁶ dry ft³ CH₄ CO: 46 lb PM/10⁶ dry ft³ CH₄

$$\frac{1,050~\text{ft}^3}{\text{minute}}~\times \\ \frac{1~\text{million}}{1\times10^6}~\frac{60~\text{minutes}}{\text{hour}}~\times \\ \frac{8,760~\text{hours}}{\text{year}}~\times \\ \frac{(100-3.6\%~\text{moisture})}{100}~\times \\ \frac{50\%~\text{CH}_4}{100} = \\ \frac{266~\text{million dry ft}^3~\text{CH}_4}{\text{year}}$$

Examples:

$$\frac{266 \text{ million dry ft}^3 \text{ CH}_4}{\text{year}} \times \frac{15 \text{ lb PM}}{\text{million ft}^3 \text{ CH}_4} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 2.00 \frac{\text{tons PM}}{\text{year}}$$

$$\frac{266 \text{ million dry ft}^3 \text{ CH}_4}{\text{year}} \times \frac{39 \text{ lb NOx}}{\text{million ft}^3 \text{ CH}_4} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 5.19 \frac{\text{tons NOx}}{\text{year}}$$

$$\frac{266 \text{ million dry ft}^3 \text{ CH}_4}{\text{year}} \times \frac{46 \text{ lb CO}}{\text{million ft}^3 \text{ CH}_4} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 6.12 \frac{\text{tons CO}}{\text{year}}$$

All particulate emissions from the combustion of landfill gas are considered as PM_{2.5}.

11. Statement of Compliance

The latest compliance inspection was conducted by Robert Barker on June 20, 2019, and the facility was found to be operating in apparent compliance at that time. The facility has been issued the following notices in the last five years:

- 10/30/17 Notice of Violation (NOV) issued for exceeding TPER for HCl and formaldehyde without first obtaining a permit. The landfill submitted an application for a State-Only permit modification, which resolved the violation.
- 04/13/15 Notice of Violation with Notice of Recommendation of Enforcement (NOV/NRE) issued for exceedance of the State BACT limit for NOx, discovered during testing of the previously installed LFG-fired engine. The facility subsequently re-tested on August 4, 2015 to show compliance. The NRE was withdrawn by DAQ on May 20, 2016, and no civil penalties were assessed.

12. Public Notice Review

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Consistent with 15A NCAC 02Q .0525, the EPA will have a concurrent 45-day review period. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit shall be provided to EPA.

The 30-day public notice period was from MONTH XX, 2020 through MONTH XX, 2020.

The EPA 45-day review period was from MONTH XX, 2020 through MONTH XX, 2020.

[Number of] comments were received during the public notice period and the EPA review period.

13. Comments and Recommendations

The permit modification application for the Rockingham County Landfill located in Madison, Rockingham County, NC has been reviewed by DAQ to determine compliance with all procedures and requirements. DAQ has determined that this facility is complying or will achieve compliance, as specified in the permit, with all requirements that are applicable to the affected sources. The DAQ recommends the issuance of Air Permit No. 10200T05.